

Status of the National Ignition Facility Project

W.H. Lowdermilk
Deputy Project Manager

University of California
Lawrence Livermore National Laboratory
Livermore, CA 94551
lowdermilk1@llnl.gov

Abstract

The National Ignition Facility has now reached the end of Title I design, defined as approximately 1/2 completion of the final Project design. We expect to break ground for the NIF building in April of 1997, and complete activation of the system in October 2002. This presentation will present a summary of the current design and schedule for the Project.

The NIF laser will be a multipass neodymium glass laser containing 192 independent 40x40 cm laser apertures arranged in 24 bundles stacked 4 high and 2 wide. Most laser components will be grouped in line-replaceable units transported in sealed containers and loaded from the bottom of the laser structure. Each laser aperture will be similar to the existing "Beamlet" testbed at LLNL, but with 18 rather than 16 laser slabs to improve performance for ignition target pulses (~5 ns equivalent pulse length at 1 ω). The NIF will require nearly 7,000 optical components at ~40 cm clear aperture.

The NIF target chamber will be a 5-m radius aluminum sphere lined with boron carbide plates. The laser will irradiate targets at the third harmonic (350 nm), and the frequency conversion crystals and other 3 ω optics will be in the target chamber vacuum. Also NIF will use a diffractive color separation grating to deflect residual 1 ω and 2 ω radiation rather than relying upon the lens dispersion used for this function previously on Nova and Phebus. These features minimize the thickness of the 3 ω optics and allow higher peak power with short pulses, as requested by potential users.

We expect NIF to operate routinely at 1.8 MJ in shaped pulses appropriate for ignition targets (~3.5 ns equivalent pulse length at 3 ω). The laser should be capable of about 20% higher output without serious risk of damage. Peak power output for short pulses will be ~750 TW.

We expect to break ground for the NIF facility and start issuing long-lead procurement contracts in April 1997. Installation of laser hardware will begin in January 1999, and we expect the first 4x2 beam bundle to be operational by April 2000. Installation and activation of the remaining laser hardware will be complete by October 2002.